





**THIS
IS
SPERRY
RAND**



FOREWORD

The purpose of this booklet is to present, primarily in terms of products, a picture of Sperry Rand Corporation.

On June 30, 1955, the new Corporation was formed by the consolidation of The Sperry Corporation and Remington Rand Inc. Each of the constituent corporations retains its divisions and subsidiaries and continues respectively as the Sperry Division and Remington Rand Division of Sperry Rand Corporation. In this country and abroad, the Corporation now has over 70 plants and employs approximately 85,000 people. Shares are held by over 100,000 stockholders residing in the United States and territories, and 26 foreign nations.

Perhaps the most immediate single impression to be gained from these pages is one of diversity, diversity of products and diversity of the areas of commercial, industrial, and national interests—on land, sea, and in the air—that these products serve. Beyond mention of broad categories, activity in certain of these areas cannot be disclosed for reasons of national security.

Company history has been minimized, but in certain instances, background has been included, against which it is possible to measure the progress that has been made. In general, during the formative years of the companies of the Sperry Division, two patterns of expansion were followed. One supplied the national defense with new and improved military equipment,



and the other led in the direction of "peace insurance."

Military business is still a vital factor in the operation of these companies, though all of them now produce increasingly in the non-military fields. One is entirely occupied with manufacturing products in the latter category. This is the New Holland Machine Company, builders of grassland farming machinery.

With the exception of war years, the companies that have gone into building the Remington Rand Division have never engaged in military production to any extent. Today, between 95 and 98 per cent of the extensive business of this Division is with commercial customers. Remington Rand Division has 12 product lines and a sales organization covering the major markets of the world.

Many Remington Rand products are familiar to the general public, and many more of them are specialized devices to increase business efficiency. The Univac® line of electronic computers, serving the requirements of large and small business, government, and scientific research, has placed this Division in the forefront of the brand-new electronics-for-business industry.

The facts presented in the pages that follow should indicate the degree of experience, of common purpose, of enterprise, of teamwork, and of corporate integrity with which Sperry Rand Corporation does its job.

H. F. Vickers

President, Sperry Rand Corporation

SPERRY RAND

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

INSTRUMENTATION AND CONTROLS

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Sperry Gyroscope Company Division of
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Sperry Farragut Company Division of
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Sperry Piedmont Company Division of
Sperry Rand Corporation, Charlottesville, Va.

The Sperry Gyroscope Company, Ltd.,
Brentford, London, England

Sperry Gyroscope Company of Canada, Ltd.,
Montreal, Canada

Sperry Gyroscope Ottawa, Ltd.,
Ottawa, Canada

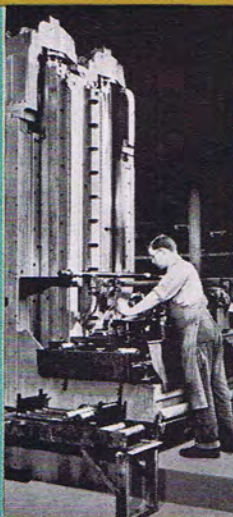
Ford Instrument Company Division of
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Long Island City, N.Y.

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Remington Rand International Division of
Sperry Rand Corporation, New York, N.Y.

Vickers-Sperry of Canada, Ltd.,
Toronto, Canada

*Vickers-Detroit Hydraulics Pty., Ltd.,
Victoria, Australia

*Stein Atkinson Vickers Hydraulics, Ltd.,
London, England

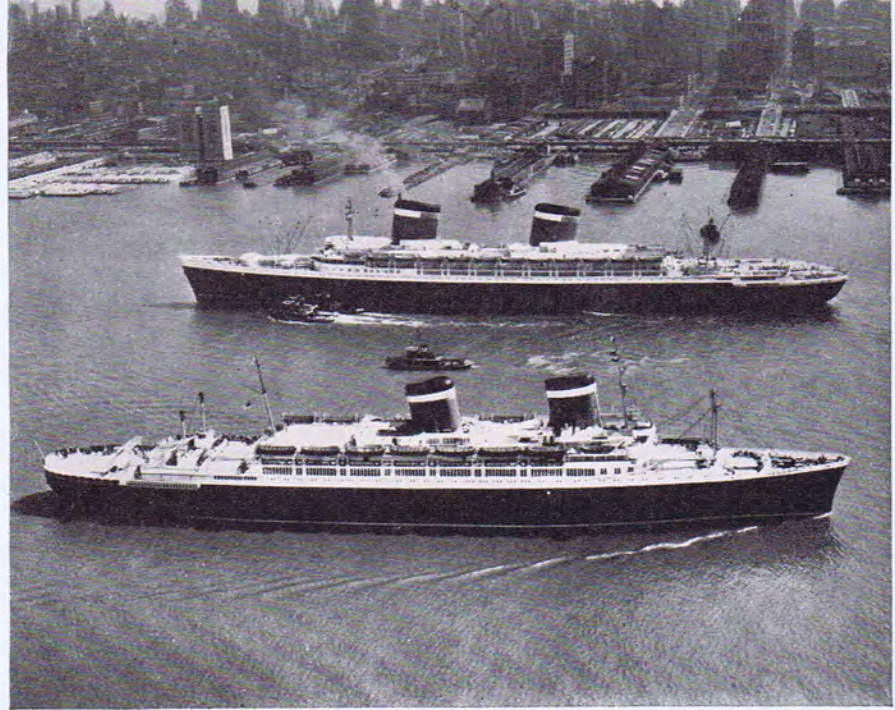
*Associated Companies



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Wherever ships sail, Sperry plays a major role in improving safety and precision of navigation. *SS United States* and *SS America* of the United States Lines provide representative examples of world's ocean-going vessels, two-thirds of which have Sperry instruments aboard.



INSTRUMENTATION AND CONTROLS

Products classified under Instrumentation and Controls are many and varied. In general, they extend man's mental powers by performing intricate calculations with speed and continuity. The uses to which they are put include precision navigation on the sea and in the air; accurate control of long- and short-range naval, military, and aerial projectiles and missiles whether used offensively or defensively; precise control of the reactors which are the core of atomic-power generators.

Wherever commercial or military airplanes fly, Sperry instrumentation helps the pilot, navigator, flight engineer, bombardier, or gunner to complete his flight, carry out his mission.

← Sperry developed a pilotless "aerial torpedo," in actuality the world's first guided missile, for the U.S. Navy in 1915-17. Pictured opposite is the Navy's combat-ready Sparrow I, air-to-air guided missile developed and produced by Sperry.





Gyro-Pilot automatically directs ship to heading, then holds course.



Radar "eye" aids safe navigation in harbor, darkness, fog, or storm.



Loran, like radar, aids safe, accurate navigation in all weather.



Smallest Gyro-Compass weighs 9 lb., has a diameter of only 9 in.

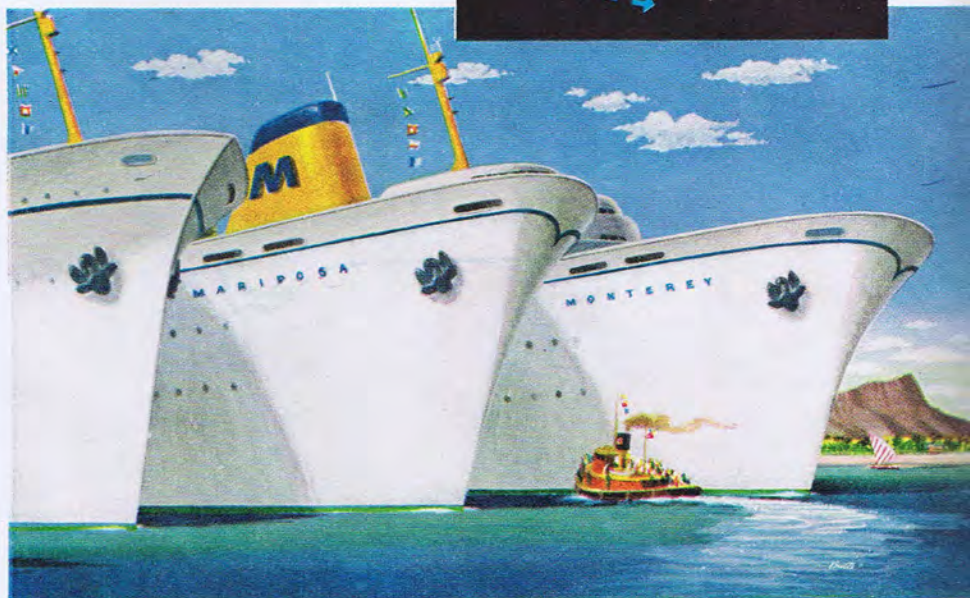
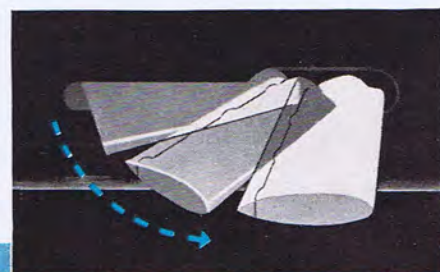
THE SPERRY GYROSCOPE COMPANY DIVISION started in 1910 with one product, a ship's Gyro-Compass. Following the success of this first product came successful pioneering in many fields: marine; aviation instruments and controls; fire control systems; radar of many types; klystron development; and, most recently, the company's efforts have become a leading factor in the development and manufacture of guided missiles.

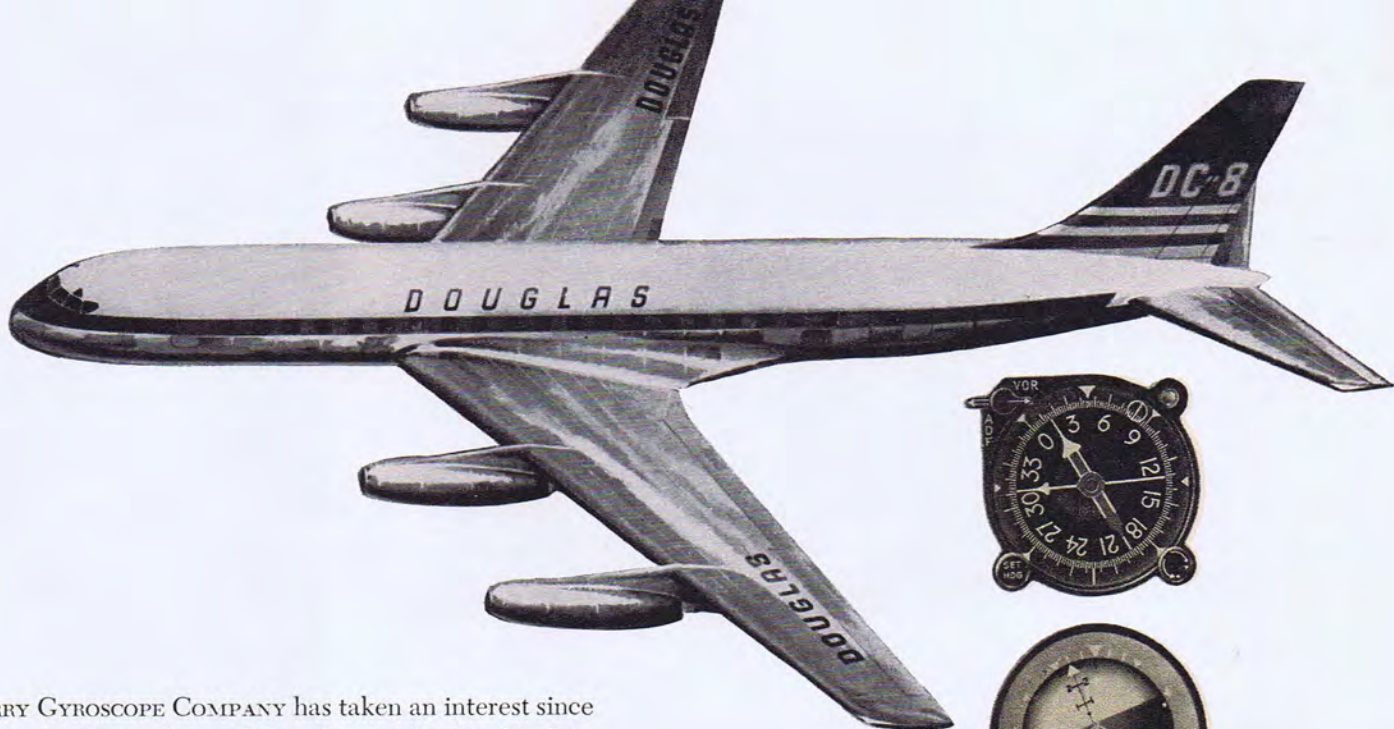
Today, in the marine field, the company builds automatic Gyropilots® that keep a ship continuously on a straighter course than could be steered by a helmsman. Sperry loran and marine radar are also commercial products markedly successful since World War II.

Sperry's interest in ship stabilization is not new. The company has been known for its work in this field for the past 35 years. In 1955, it introduced its Gyrofin Stabilizer. Automatically controlled by instruments on the bridge, this stabilizer, by means of underwater fins — one on each side of the vessel placed approximately midway between the bow and the stern — can reduce roll as much as 90 per cent.

With demand increasing for Sperry marine products, including advanced systems for military use, a new facility at Charlottesville, Va., is being constructed. Known as SPERRY PIEDMONT COMPANY DIVISION, this new organization is scheduled to begin production on a variety of commercial and military products in 1956.

First ships to install new Sperry Gyrofin Stabilizer are the *SS Mariposa* and *SS Monterey*, operated by the Matson Lines. Inset shows operation of Gyrofins, which are extended from recesses in hull amidships.





SPERRY GYROSCOPE COMPANY has taken an interest since the pioneering days of the airplane in the development of flight instruments. It was this early activity that pointed the way to the automatic pilot, an instrument which came into its own with the introduction of long-range passenger air travel.

The Sperry Flight Control Systems of today are electronic equipments which provide civilian aviation with the precision demanded by closely defined flight paths, and military aircraft with the control needed to meet the exacting requirements of the bombing run and the high-altitude, long-range mission of bombers, interceptors, or unmanned vehicles.

Development of a flight control system along advanced engineering principles is as essential at this time, in meeting jet airliner requirements, as new aircraft-design concepts were essential to capitalize on the increased power of jet engines. Most recently, Sperry's unparalleled experience in designing and building flight control systems for multi-jet aircraft has resulted in a new SP-30 Flight Control System. Based on an entirely new concept of flight control, this system will provide tomorrow's jet and turboprop commercial airliners with levels of air safety and passenger comfort surpassing anything produced by the company in 40 years of automatic pilot development.

In 1950, Sperry began deliveries of a Zero Reader® flight director. Described as "revolutionary" by early users, this instrument made it possible, for the first time, for a human pilot to follow one simple indicator and fly and navigate his aircraft manually with a degree of accuracy, precision, and ease approaching the performance of automatic control.

Today the flight director is the principal feature of Sperry's new Integrated Instrument System, which gives the pilot and co-pilot of the faster, more sensitive aircraft of this transonic and supersonic age a clear pictorial presentation of all flight data in a simple, compact form.



Sperry Flight Control Systems now fly transports of world's major airlines. New SP-30 System, which includes Integrated Instrument System, above, has been designed to supply cockpit instrumentation and meet exacting requirements of tomorrow's jet transports, such as Douglas DC-8, illustrated at top of page.





Sperry airborne radar developed for USAF increases accuracy of navigation, aids flight over uncharted terrain, helps in eluding storms.



Pilotless "drone" ready to be flown by man at remote-control station in background. Radio-controlled drones depend for instructions on Sperry remote-control flight systems.

At the SPERRY FARRAGUT COMPANY DIVISION, Bristol, Tenn., a Navy facility, production is going forward on the Sperry Sparrow I. This is the first air-to-air guided missile in the nation's arsenal to be turned out in volume for operational use. Developed in co-operation with the Navy's Bureau of Aeronautics, this weapon — recently revealed as having reached combat-ready status — is radar guided, rocket powered, and maneuverable at supersonic speeds. Its deadly accuracy has been demonstrated by hundreds of launchings against drone targets. Successful attacks have been completed against high-speed jets and other missiles.

Among other missile activity, a Sperry-developed automatic control system stabilizes Chance Vought's Regulus, a Navy missile for launching from submarines, surface ships, and shore bases. Sperry Gyroscope Company Division is engaged in seven major missile projects, including the guidance system for the Navy's shipboard weapon, Terrier.



Navy's Regulus zooms skyward. Missile has Sperry automatic control system.



As pioneer in microwave measuring techniques, Sperry has developed Microline® instruments, which include every type of device essential to precise measurement in entire microwave field. Above instrument, which simplifies radar maintenance, is example of these products.

As a result of over 10 years of flight research in the field, Sperry has perfected a flight control system that gives the helicopter precise automatic stabilization under the most exacting conditions. In addition, special instruments which include a flight director are among the company's recent developments in the field of helicopters.

IN 1938, SPERRY sponsored the development of the klystron tube. Radar, one of the most closely guarded secrets of World War II, employed these tubes extensively.

With the coming of peace, the klystron became available for commercial applications and found prompt acceptance in the field of communications.

More than 85 types of klystrons, ranging in power from a few thousandths of a watt to many millions of watts and in frequencies covering the microwave radio spectrum, are made by Sperry Gyroscope Company Division today.

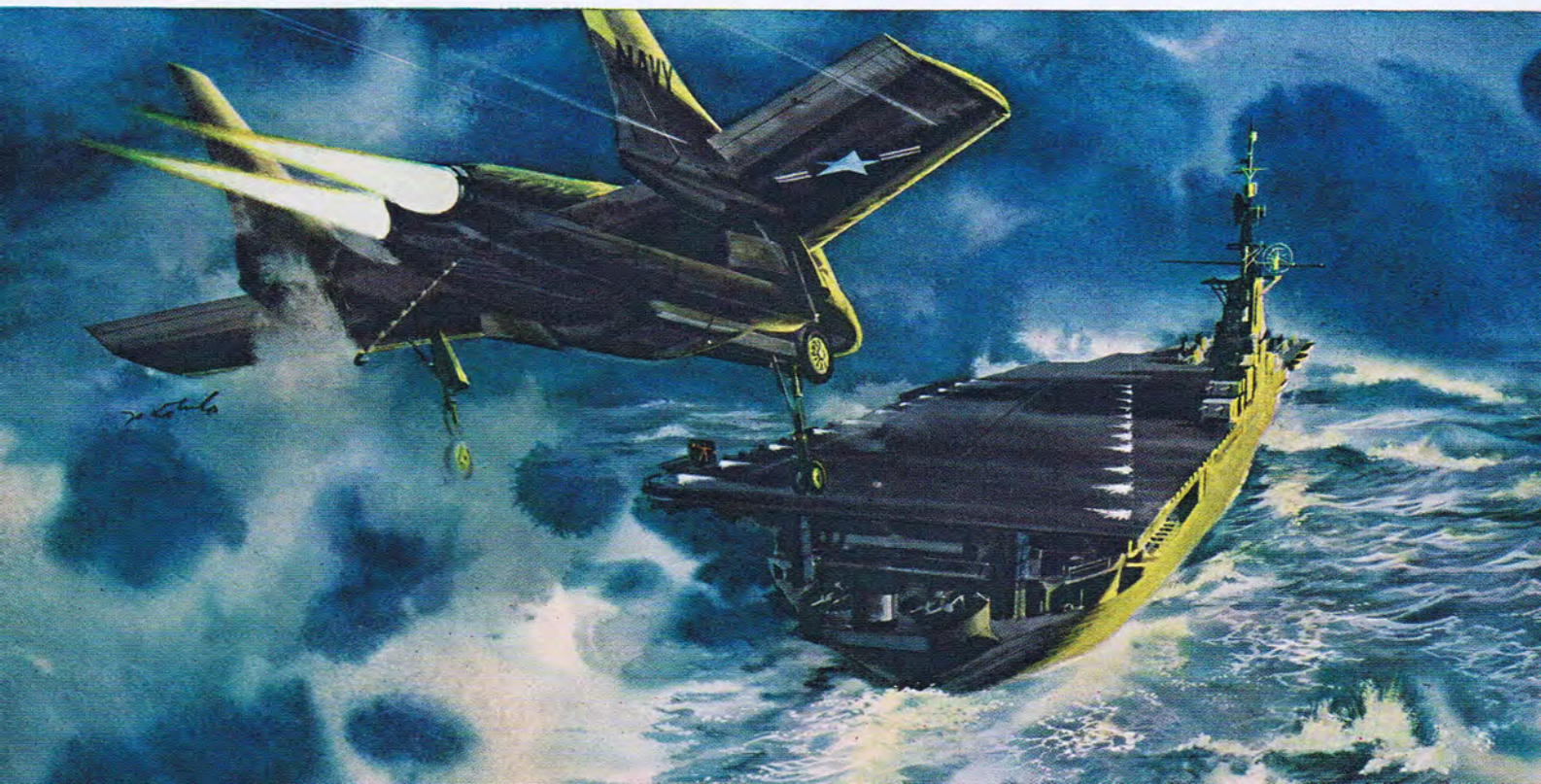
Megawatt klystrons are the power sources behind radar defenses, making it possible to detect approaching planes at greater distances than ever before. These tubes, with moving target indication, permit radars to show indications of moving objects only, even at great distances, and thus give our defenses more time to be alerted. In guided missiles, the klystron makes possible more accurate control, permits guidance over longer paths.

Demand for these tubes has so increased that production facilities at the Great Neck plant have been outgrown and a plant has been built at Gainesville, Fla., which, in 1955, began operating as the SPERRY ELECTRONIC TUBE DIVISION.



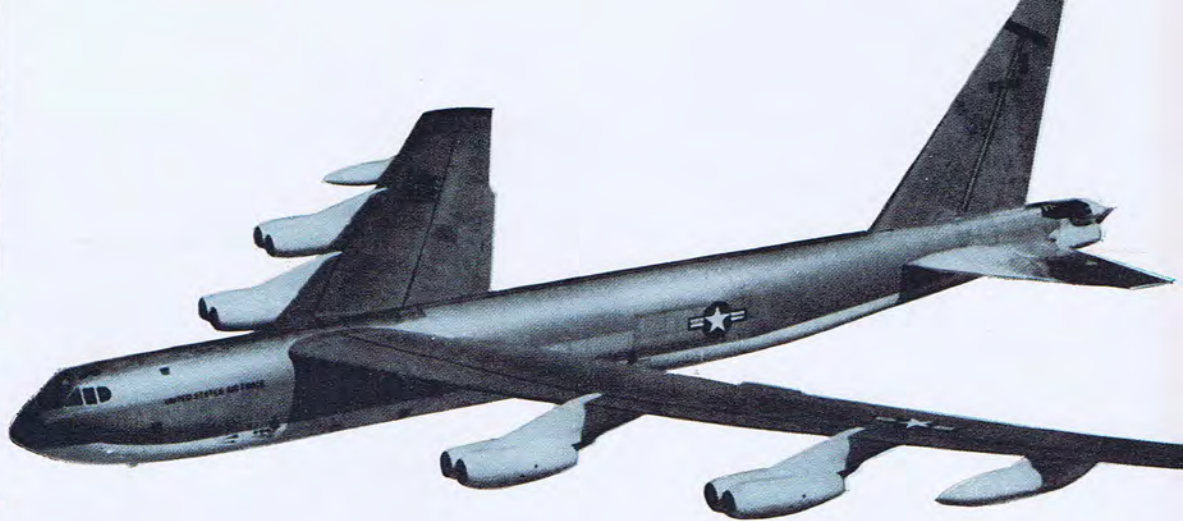
A 4,000,000-watt klystron designed to power advanced Air Force radar. Eight-foot giant is prototype for series of military's most powerful microwave tubes.

TACAN, new Tactical Air Navigation System developed for U. S. Navy by IT&T's Federal Telecommunication Laboratory, owes much of its power, range, and dependability to the Model SAL-39 klystron designed for this project by Sperry.





Sperry-developed K Bombing-Navigation System. Latest-to-be-announced improvement over this system is Sperry-designed-and-built MA-6A System for installation on B-52 Stratofortresses, Strategic Air Command's 8-jet superbombers.



Airborne radar, which helped beat the submarine menace in World War II, has a variety of assignments today. For installation aboard troop-carrying transports and cargo aircraft of the USAF, Sperry is making a very advanced airborne radar system believed to be the smallest and lightest for its power and range. This instrument can perform varied, precise functions of search and surveillance, storm detection, and all-weather navigation procedures.

Today's Strategic Air Command B-52 bombers, most advanced intercontinental jet aircraft, are equipped with the Sperry MA-6A Bombing-Navigation System, which combines sighting by radar and navigation by Sperry Flight Control System. This new system, only recently made public, is an improvement over the K-System designed previously by Sperry for the huge B-36 and the all-jet B-47 bombers.

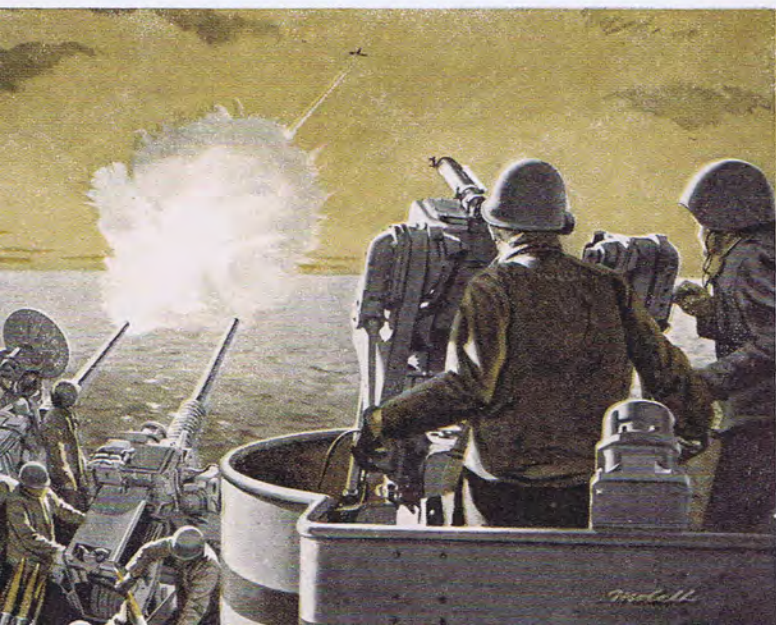
With the entry of the Republic F-84E Thunderjet into the action in Korea, the Sperry "triple-threat" gun-bomb-rocket sight met its first combat commitment. Until the end of this war, these sights played a continuous and important role in helping to defeat the enemy from the air. Since

Korea, Sperry engineers have been developing advanced-type fire-control systems for the jet interceptors of tomorrow.

On the world's leading airlines and many U. S. military aircraft, Sperry Engine Analyzers keep a constant check on every part of a plane's ignition system, or detect other malfunctions through vibration analysis. Engine Analyzers, including vibration analysis, have now been developed for turbojet and turboprop engines. In addition to fixed-wing aircraft, Engine Analyzers are applicable to helicopters, and portable models are used in ground maintenance and engine



In use on many of the world's leading airlines, Sperry Engine Analyzer detects engine defects during flight or on the ground.



test cells. Sperry is also making contributions to aviation through development of precision engine control systems for turbine-powered aircraft and guided missiles.

One of Sperry Gyroscope Company Division's largest assignments in recent years has been the production of the gunfire control system for the Army's Skysweeper anti-aircraft gun. Radar-directed, and thus effective day or night

regardless of weather, Skysweeper automatically finds and tracks approaching aircraft flying at transonic speeds.

For the Navy, the company, in co-operation with the Navy's Bureau of Ordnance, has developed the Mark 63 Gunfire Control System. This system picks up, either optically or by radar, an enemy jet fighter as it flashes across the sky, automatically tracks the plane's approach, computes range and firing data electronically, and then — all within the same fraction of a second — aims the anti-aircraft guns and fires them automatically.

In the field of ground armament, Sperry produces the Army's Counter-Mortar Radar AN/MPQ-10, or Mortar Locator. This is a joint development of Sperry Gyroscope Company Division and the U. S. Army Signal Corps. Aided by this new electronic locator, front-line forces can detect and "lock on" the path of enemy mortar shells, automatically track their trajectory, and thus reveal the enemy position.

The company is constantly expanding its technical staff in order that its long experience in developing *systems* may be best utilized to meet new weapons system responsibilities in such fields as guided missiles, bombing and navigation equipment, and fire control.

EARLY IN 1915, the expanding European market for products of Sperry Gyroscope Company Division made it necessary to establish THE SPERRY GYROSCOPE COMPANY, LTD., in London. Great Britain was at war, and one of the vital needs of the Royal and Allied Navies was for Gyro-Compass equipment. Today, three plants are needed to handle the manufacturing activity of this company. In general, the marine and aeronautical products manufactured by this company parallel the major ones produced by Sperry Gyroscope Company Division.

Radar and gyroscopic gunfire control equipment is being developed and produced for the Royal military services. Guided weapons also form a substantial part of the company's activities.

A wholly owned subsidiary, INDUSTRIAL PRODUCTS (SPECO), LTD., was formed in 1948 to market certain products in the United Kingdom, especially automatic weighing and packaging machinery, by agreement with Wright Machinery Company, a domestic subsidiary of the Corporation.

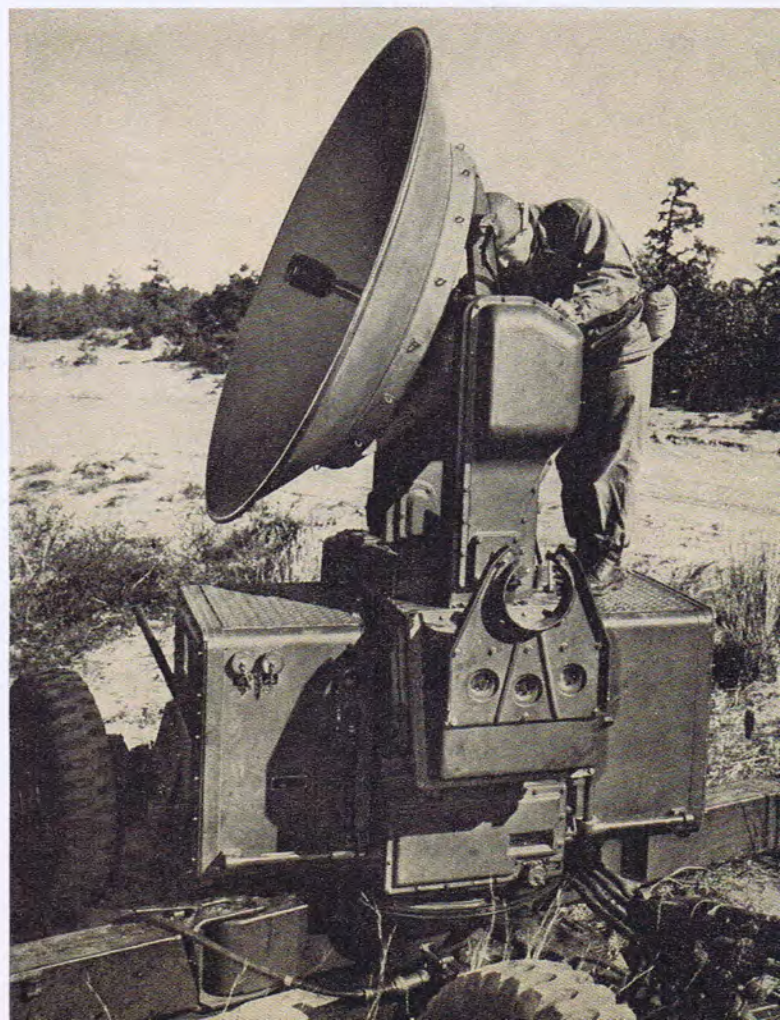
The SPERRY GYROSCOPE COMPANY OF CANADA, LTD., was formed late in 1950. A modern plant situated in Montreal's newest industrialized section was completed for the Canadian Government in 1952, to meet expanding demands for Sperry instruments and controls. In 1955, Sperry purchased this plant from the Canadian Government.

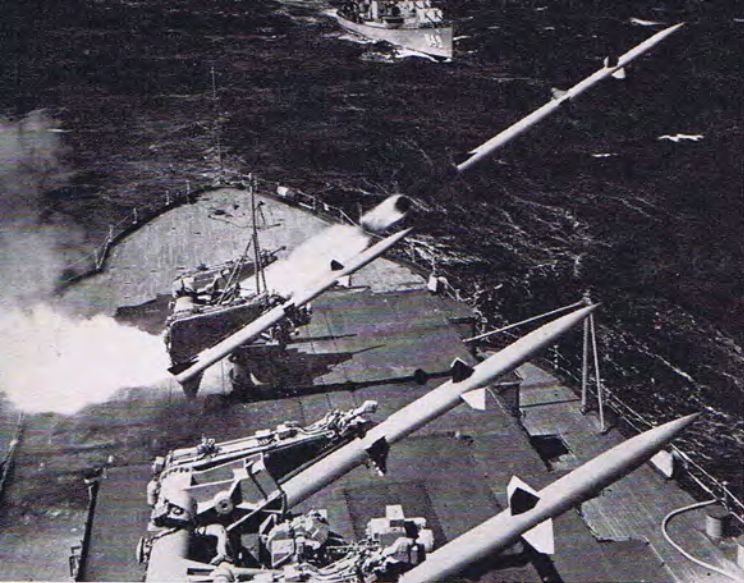
In 1951, the Ottawa firm of Ontario Hughes-Owens Company, Ltd., was purchased and is now being operated under the name of SPERRY GYROSCOPE OTTAWA, LTD.

Skysweeper "sees" through fog and darkness, picks out enemy within 15-mile radius, computes its speed, altitude, and course in seconds, automatically aims, and shoots the plane out of the sky.



Automatic radar tracker of Mortar Locator detects and "locks on" path of enemy mortar shells and, in effect, traces each shell back through its trajectory to reveal position of enemy.





Firing deadly anti-aircraft Terriers from guided missile cruiser *USS Boston*, only ship of its kind in the world. Ship is equipped with Ford launching computers for missiles.



USS Carronade, Navy ship designed to replace the Landing Ship Medium used in World War II to give close-in support of shore troops. Some of ship's computers are Ford developments.

Redstone Ballistic Missile, long-range, rocket-powered bombardment weapon developed by U. S. Army Ordnance. Missile is progenitor of more advanced missiles in Army's vital missile program. Ford Instrument Company Division helped develop and design the missile's guidance system, and the company is now manufacturing this system.



FOUNDED IN 1915, FORD INSTRUMENT COMPANY DIVISION started on its long career of contributing to the superiority of the U. S. Fleet by developing and building for the U. S. Navy the first computer to solve naval gunfire control problems. Today, the company's most recently developed fire-control computer still solves the problem of firing accurately at modern jet aircraft or distant, high-speed warships from pitching, rolling ships steaming at any speed.

Not only does Ford build gunfire control computers of the most modern type, but, in co-operation with the Navy Bureau of Ordnance, the company also has designed and built computers for launching rockets and the computers for launching the Terrier guided missiles from the *USS Boston* and *Canberra*.

For a number of years the engineers of Ford Instrument Company Division have been working with Army Ordnance on developing, designing, and building the guidance system for the Redstone Missile. At present, Ford is engineering and manufacturing the guidance system for this missile under contract with the Chrysler Corporation. Along with work on the development and product improvement of the guidance system for the Redstone Missile, the company's newly formed Missile Development Division is carrying on research, development, and design work on the guidance system for more advanced missiles for the Army Ballistic Missile Agency.

In co-operation with the Air Force, Ford has developed an airborne navigational computer, the AN/ASN-6 (Ground Position Indicator). To an airplane pilot, this instrument

provides continuous indication of the latitude and longitude of his plane without air-to-ground or ground-to-air communication.

A new instrument, an advance over the Ground Position Indicator, is the AN/ASN-7 currently being flight-tested by the Air Force. The AN/ASN-7 is a Course and Distance Indicator which informs the pilot of the distance he must fly and the direction he should head to reach a predetermined destination. The instrument also gives present position in latitude and longitude. When available for civilian use, it promises large sales for transport aircraft.

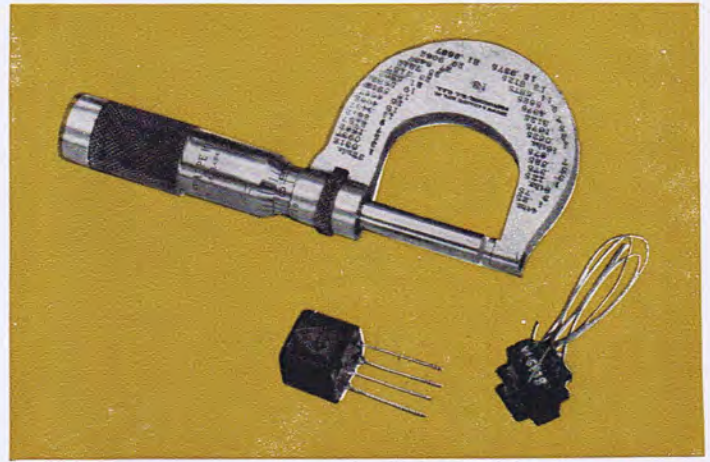
FOR SEVERAL YEARS Ford has been working with Atomic Energy Commission contractors and has developed and built the controls for the nuclear reactor of the submarine *Seawolf*. Recently, the company's Atomic Energy group has designed a closed-cycle gas turbine nuclear reactor for use in non-military power plants.

Many other devices, most of them of a classified nature, are being worked on for the Army, the Navy, and the Air Force. These cover many phases of computer and control work and include such items as plotting boards, shore bombardment computers, reconnaissance camera controls, cruise control computers, tail-pipe temperature indicators for jet aircraft, ground-to-air data links, etc. In addition, there is a constant demand for the many precision components manufactured by Ford and sold to other manufacturers.

WRIGHT MACHINERY COMPANY was established in 1893 and became one of the nation's pioneers in automatic packaging. It has been a subsidiary of the Corporation since 1945. Today, Wright is the largest packaging machinery manufacturer in the South. Its Hy-tra-lec® weighing and filling machines are well-known in the packaging industry, as is also its machine for automatically applying revenue stamps to liquor bottles.

During World War II, Wright Machinery Company produced intricate precision instruments used by the military forces. It has continued and expanded operations in this field and today is one of the few precision manufacturers in the South. Its newest line of precision equipment is a fractional horsepower electric motor.

Typical packaging machine, product of Wright Machinery Co., in use at the Holloway Candy Co. plant in Chicago, Ill.

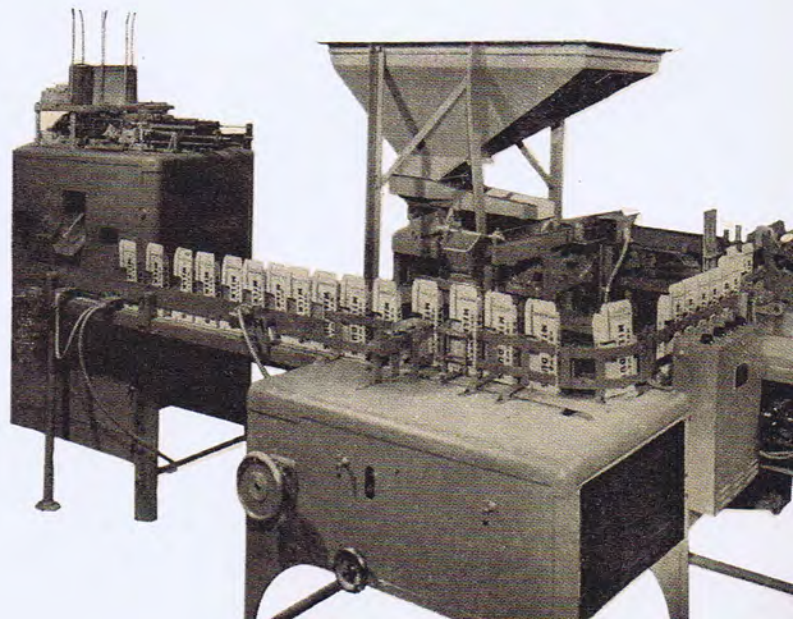


Wheeler Insulated Wire Company's "Tiny Mite" miniature transformers fill demand for miniaturization for transistor audio uses. Their extreme compactness also makes them suited to use in printed circuit systems for control, guided missiles, and similar applications.

THE WHEELER INSULATED WIRE COMPANY, INC. has been serving the electrical and electronics industries for over 48 years.

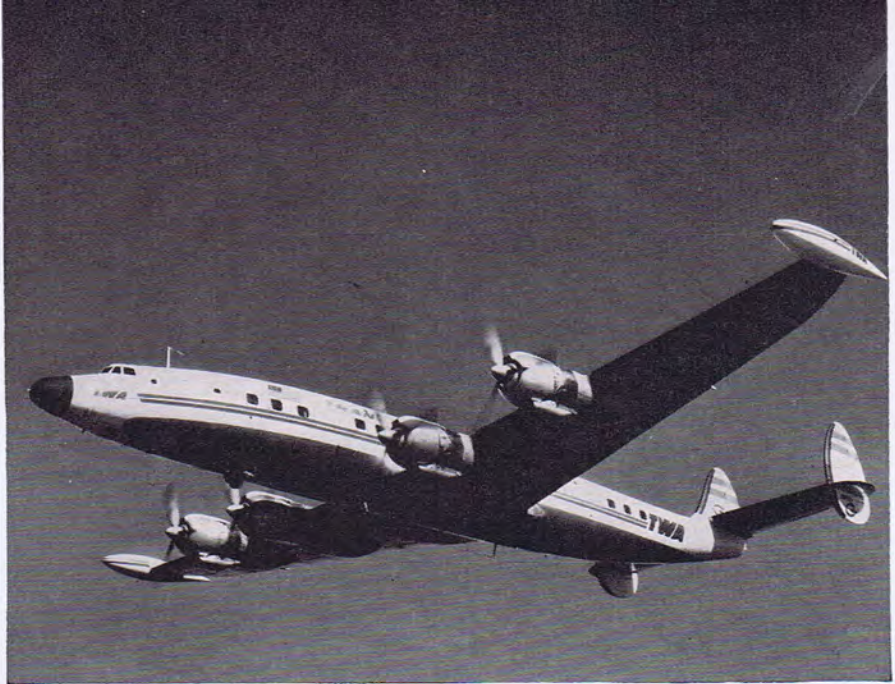
Wheeler has been a part of the Corporation since 1943, and as the electronics industry has grown since the end of World War II, so the company has expanded its product line to include precision-type coils and transformers, electronic assemblies, and electrical harness assemblies.

Wheeler also manufactures a sound-powered telephone that derives directly from the voice all power used in the transmission of speech. No batteries or other power supply is used. The company supplies this product in various models, from a simple pair of phones to multi-station systems.





Among the outstanding performers in the world's air transportation fleet is Lockheed's Super G Constellation. Vickers hydraulic components contribute to the dependable operation of both the primary and secondary hydraulic systems on this line of aircraft.

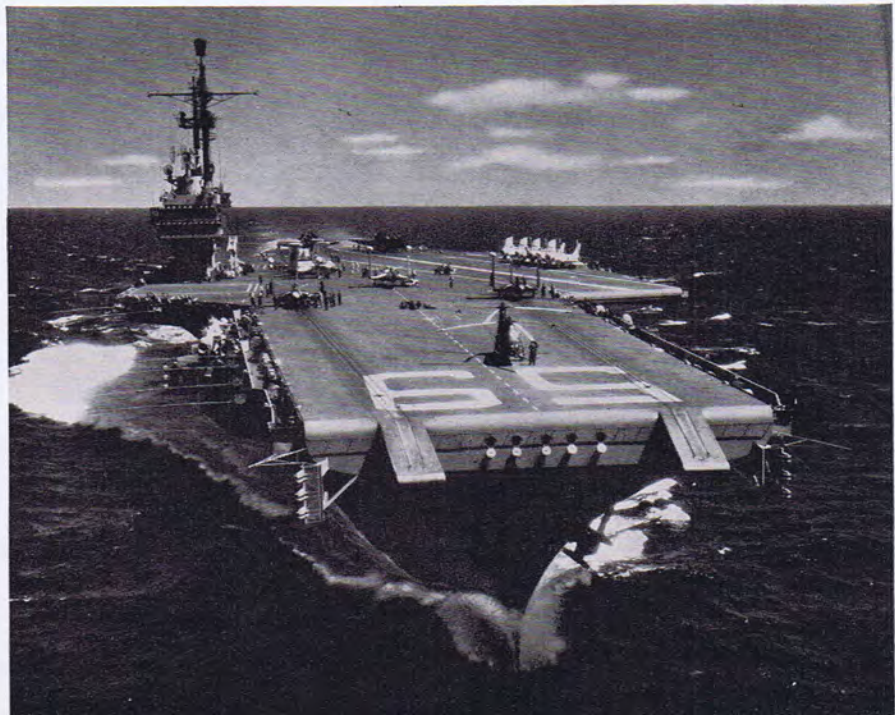


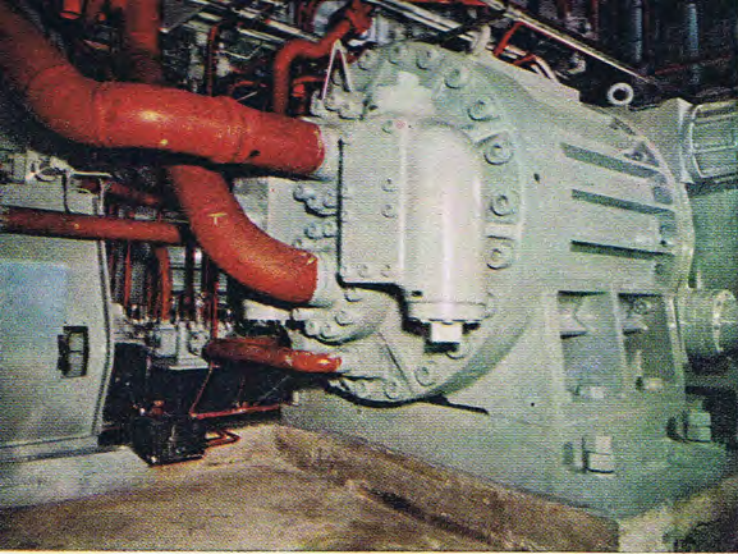
HYDRAULICS, MACHINERY, AND ELECTRICAL APPARATUS

Wherever there is need to transmit power in machines and where that power must be varied from time to time in amount and speed, and where control of the power is important, there is a field for an oil hydraulic system. Thus, oil hydraulics extends man's physical powers by providing precise control of speed and power for many purposes. Flexibility with minimum size and weight is its major advantage. ■ Electrical apparatus includes several products and components that are fundamental in the electric and electronics industries.

Five divisions and subsidiaries of Sperry Rand Corp. have equipment aboard the *USS Forrestal*, first of a number of the Navy's super-sized carriers. Hydraulic pumps, transmissions, and complete control systems; electrical degaussing control, interior communication, and fire control power supply equipment were manufactured by companies represented in the following section.

← Building a logging road in Idaho. Immense work capacity with extreme flexibility and ease of control is typified by this Vickers-equipped Caterpillar D8 Tractor with bulldozer.





One of two huge Waterbury pumps — largest of their kind ever built — in use on the world's largest tube reducing machine at the Tube Reducing Corp.



Refueling of ships while under way was developed by U. S. Navy during World War II. Waterbury hydraulic transmissions are utilized on the winches which control the tension on fuel lines.

Power hydraulics finds a variety of applications in steering and various machinery drives aboard ships of the Merchant Marine. *SS Santa Barbara*, of Grace Line, is equipped with five hydraulic topping winches for use in handling cargo.



VICKERS INCORPORATED is the world's largest manufacturer of oil hydraulic devices. Five manufacturing plants and an Administrative and Engineering Center serve the Armed Forces and diversified industries for which it builds power hydraulic equipment.

Oldest of the divisions of Vickers Incorporated is WATERBURY TOOL DIVISION. In 1903, this company built the world's first self-contained, high-pressure oil hydraulic transmission.

Substantial growth of the oil hydraulics industry did not occur until a lower-cost, high-pressure pump had been developed. This took place in 1925, when Mr. Harry F. Vickers, now President of Sperry Rand Corporation, developed a balanced vane-type pump designed to utilize a basically different pumping principle. The Vickers Manufacturing Company had been started in 1921, and the new pump marked the beginning of the company's growth.

Builders of machine tools were the first to use the new hydraulic pumps extensively. Today, almost all types of metal-cutting and shaping machines are available with hydraulic controls. These include the massive in-line transfer machines that perform their operations in one sequential and continuous manufacturing process and are the basis of the growing trend towards industrial automation.

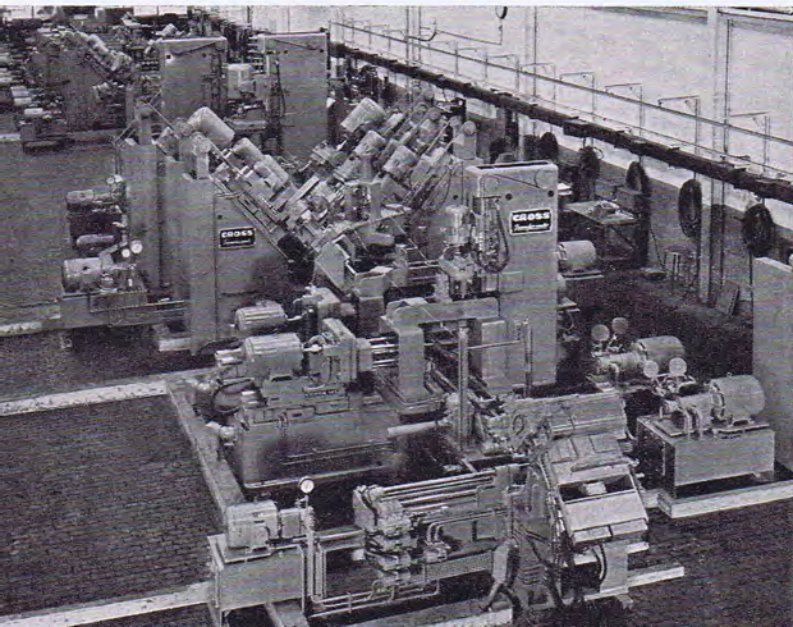
The Vickers balanced vane-type pump combined with a hydraulic servo booster found early application in power steering of automobiles. This use, which only recently became general, was pioneered by Mr. Vickers in 1925. The latest Vickers pump for passenger car steering is designed for integral mounting on the generator.



Hydraulic pumps manufactured by Vickers are used in power steering on Ford Motor Company's luxurious new Continental Mark II. More 1956 cars use Vickers hydraulic pumps for power steering than all other makes combined.

The hydraulic era in construction machinery also began in 1925, when hydraulic control was applied to the bulldozer. During World War II, hydraulic power in heavy construction machinery thoroughly proved itself. When jungles had to be made into airports, harbors cleared of wreckage, roads gouged out of mountains and built through wilderness, swamp, and desert, experts found that hydraulic equipment enabled them to perform earth-moving miracles.

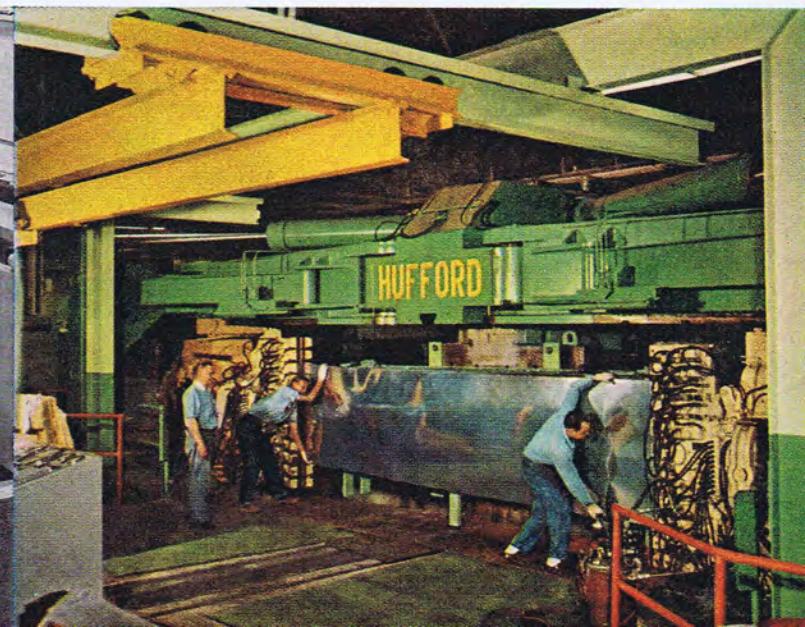
Automation: In-line transfer machines that perform machining operations in automotive industry use hydraulics extensively.

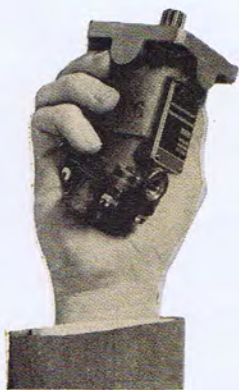


VICKERS INCORPORATED became a subsidiary of the Corporation in 1937. Waterbury Tool Company had been acquired in 1935. In 1941, Waterbury was merged with Vickers.

During World War II, military aviation put severe requirements on hydraulics. It has continued to do so, and today airborne hydraulic applications range from landing gears and flight controls to in-flight refueling devices, wing-

Hydraulically operated metal-shaping machine forms large "skin" sections for airplane wings and fuselage.





Critical factors in aeronautical equipment are size and weight. Typical Vickers pump used in many aircraft hydraulic systems is small enough to be held easily in palm of a man's hand.



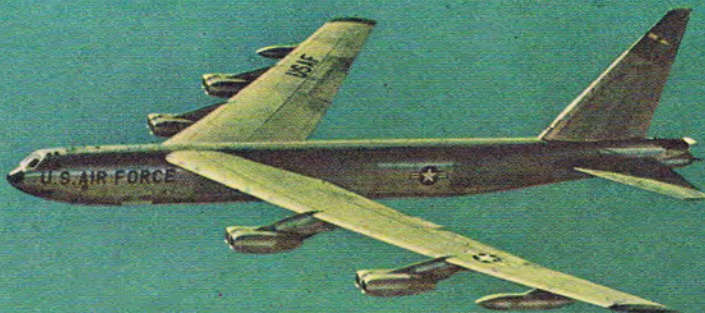
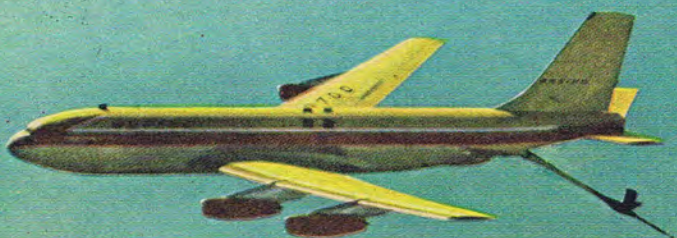
folding mechanisms, and after-burner control of jet engines.


The amazingly rapid development of power plants and airplane structures has brought about speeds, attainable altitudes, and rates of ascent and descent far in excess of the limits of human comfort. Military fliers must be equipped with oxygen masks, pressure suits, and similar clothing to create artificial environments in order to survive. For the general public, however, such helps are impractical, and civilian air transportation of passengers would be anchored to near pre-World War II speeds and altitudes were it not for pressurized and temperature-conditioned cabins. The hydraulic drives for the superchargers on many of the passenger airplanes flown by both domestic and foreign lines were developed and manufactured by Vickers Incorporated.

EL SEGUNDO DIVISION of Vickers Incorporated, at El Segundo, Calif., is a complete and self-contained facility for the design and production of special and standard airborne hydraulic valves. Applications include aircraft, missiles, and helicopters. Close liaison with airframe engineers in the area assures full understanding of requirements.

Since oil has a very small coefficient of compression, it can be made as rigid and unyielding as steel; yet, because it is fluid, it can easily be made to follow any path determined by its confining pipe or hose. The power train of a machine of almost any type can therefore be designed to give exact speed and sequence of motion with the precise amount of desired thrust and torque. This characteristic of oil hydraulics accounts for the variety of industries in which Vickers hydraulic equipment is well represented. Some of them are the lumber, logging and plywood industries; the farm machinery industry; mining, steel, and oil.

Planes maintain speed nearing 500 mph as boom of Boeing KC-135 prototype jet tanker is lowered for transfer of fuel to B-52. Vickers hydraulic pumps operate main and utility systems; Vickers hydraulic motors drive tanker's aerial refueling pumps.





Vickers hydraulic equipment has been utilized on Convair F-102A, first USAF supersonic all-weather, day-or-night jet interceptor. It will be noted that plane has "hour-glass" design, a new feature for increasing performance of supersonic aircraft.

There are many instances where a substantial amount of power must be delivered to a hydraulic machine. Vickers Incorporated is now producing a new line of pumps suitable for developing pressures up to 5,000 psi to satisfy this type of service. It is expected that these pumps will find many applications, particularly in the hydraulic press field.

Production facilities at The Sperry Gyroscope Company, Ltd., Brentford, England, are now providing a home source for certain major Vickers aircraft hydraulic components to British airframe manufacturers. Other European nations will also be able to secure Vickers aircraft hydraulic units either from England or the United States.

Many Vickers industrial-type pumps and valves are made by associated companies in England and Australia.

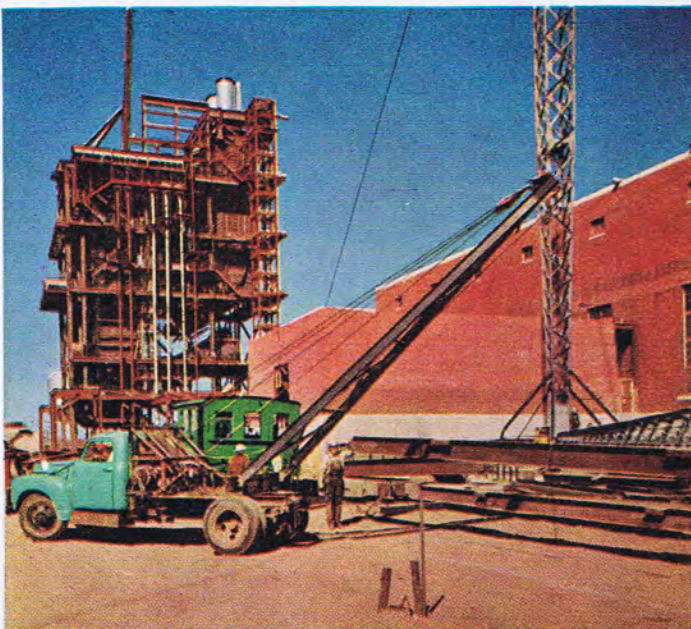


F-100C, one of the latest of the group of Super Sabres, uses Vickers hydraulics to power flight control system.



Vickers-equipped high-lift stacker in warehouse storage effects maximum utilization of floor space at the lowest handling cost.

Precise control of the Tulsa Hydraulic-Drive Winch mounted behind cab of truck simplifies handling of girders on construction job.



TULSA WINCHES, products of the TULSA WINCH DIVISION of Vickers Incorporated, are found in nearly every field having heavy pulling and lifting requirements — for example, farm and ranch work, construction projects, freight loading and unloading, pipe-line and other oil field work, public utilities, logging, and wrecking. Of the 75 models manufactured, the majority are power take-off type for installation on small- and medium-sized trucks. Many are also suited to tractor mounting. Most recently, the company has developed a hydraulic drive winch which, by providing remote control, is opening up to company products many new fields of application.

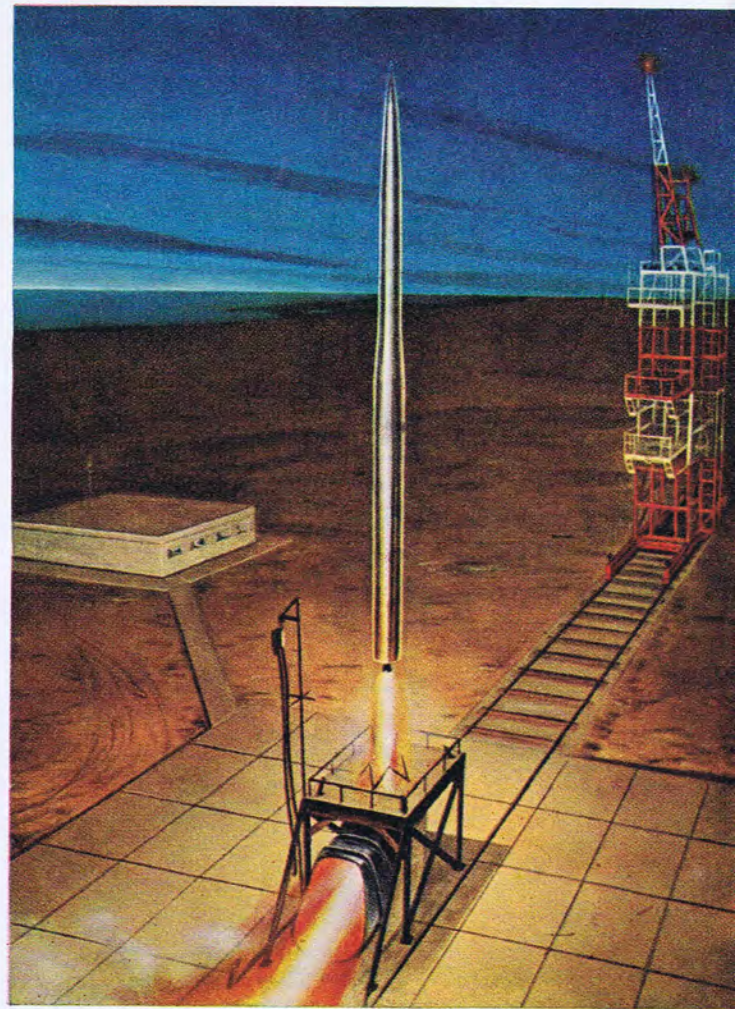
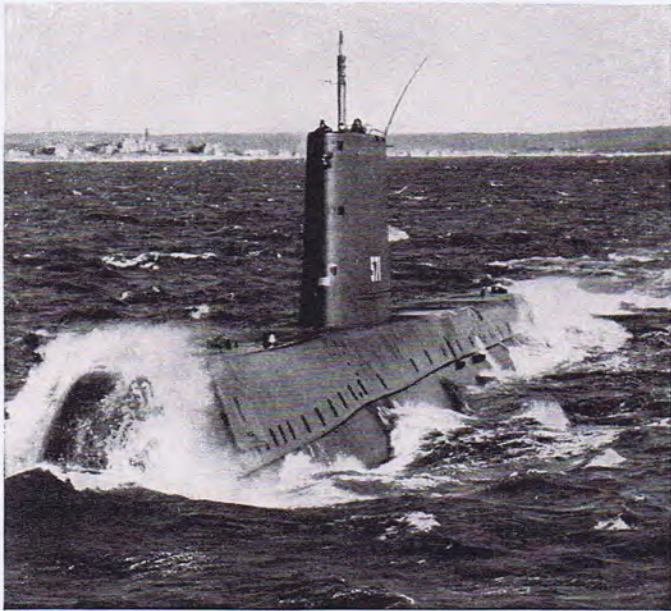
IN 1948, VICKERS ELECTRIC DIVISION of Vickers Incorporated was formed by the merger of two small, previously acquired subsidiaries. The company has made many advances in the design and production of diversified products intended to provide new and better solutions to control problems. Magnetic amplifiers, selenium rectifiers, photo-electric cells, magnetic-particle clutches and brakes, arc welders, d-c power supplies, control equipment for theater and television studio lighting, and allied units are produced as standard products. Special components for complete systems employing magnetic and electronic controls are custom-built to exacting requirements.

Vickers Electric Division is the first company in the United States to produce magnetic amplifiers as standardized commercial equipment. The patented Vickers Self-Saturating Magnetic Amplifiers, capable of amplifying complex electrical signals ranging from milliwatts to kilowatts have made possible entirely new solutions to many knotty control problems. Thus far, the company has developed and produces more than 7,500 amplifier designs and ratings. Transformers, reactors, and selenium rectifiers required for these amplifiers are also manufactured by the company. This policy of manufacturing basic components used in Vickers Electric Division products gives development and application engineers freedom of choice and control.

While Vickers Electric Division produces a diversified line of products for commercial use, many facilities are also devoted to the research and development of equipment for the Armed Forces. The majority of this activity cannot be described for security reasons, but the company is particularly proud of its work in developing special degaussing, sonar, and regulating systems that were incorporated in the Navy's first nuclear-powered submarines, the *USS Nautilus* and the *USS Seawolf*.

Project Vanguard, right: Artist's conception of satellite system as it roars off launcher. In background is the gantry used to place vehicle on launching stand, and at left is concrete blockhouse from which scientists will fire rocket and record its course.

Launching world's first atomic submarine *USS Nautilus* marked first practical application of nuclear power. Components used in antisubmarine sonar as well as other electrical and electronic equipment on vessel are products of Vickers Electric Division.



As part of its participation in the International Geophysical Year, 1957-1958, the United States will attempt to place the first man-made satellite in an orbit around the earth. Known as Project Vanguard, the undertaking is under the direction of the U. S. Navy, with The Glenn L. Martin Company of Baltimore the prime contractor for the launching vehicle, which is to be a three-stage rocket.

Early this spring Vickers Electric was selected to design and manufacture the magnetic amplifier auto-pilot unit that will control the flight of the Vanguard vehicle from its launching point on Florida's east coast to an altitude of approximately 300 miles above the earth.

The memorable color telecast of "Alice in Wonderland" from the new NBC-TV studio in Brooklyn, N. Y. Studio boasts having the most elaborate lighting in television. Magnetic Amplifier Type Dimmers on equipment were supplied by Vickers Electric Division.





Mowing is the first step in harvesting the grass crop. New Holland Mower operates at speeds up to 5 mph and will cut up to 4.25 acres per hour.



FARM EQUIPMENT

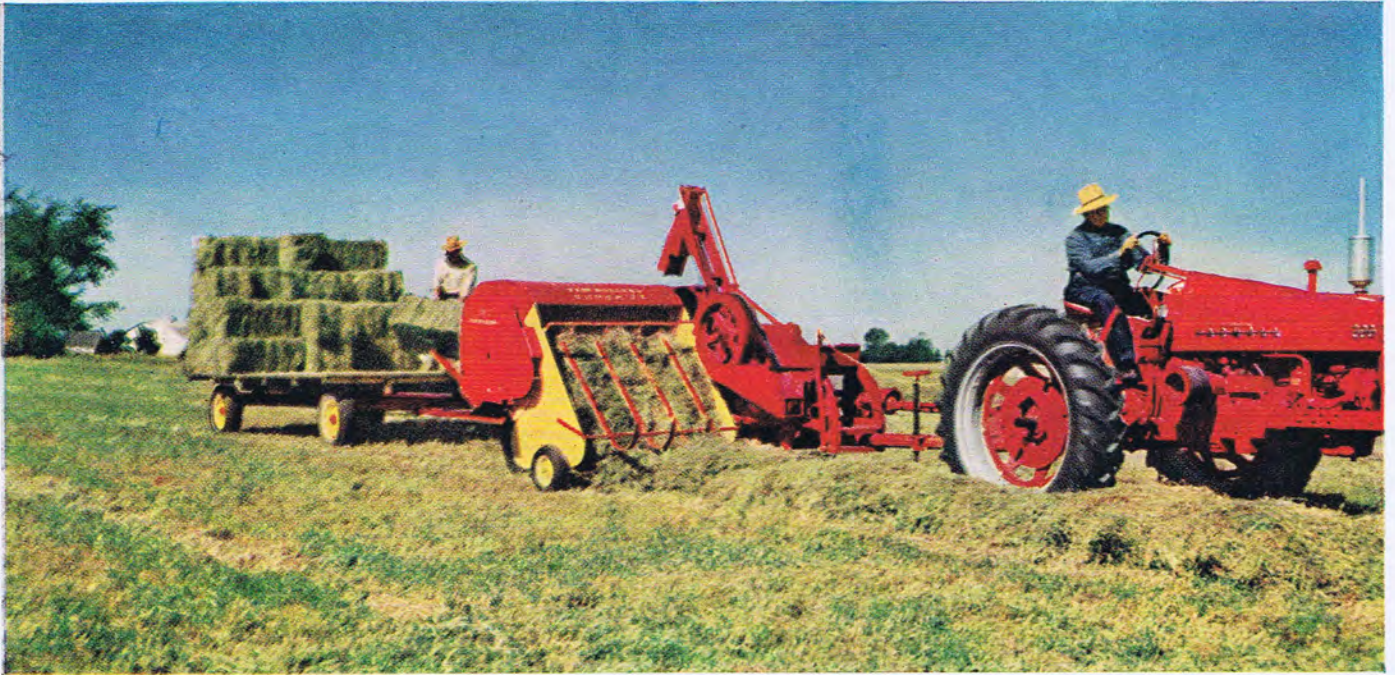
To give the farmer the tools with which to provide more food and at the same time lighten the burden of his work, industry and agriculture have combined forces to mechanize farming methods. ■ So far, New Holland has concentrated on developing and building machines for use in grassland farming. Although, as pasture and dried hay, grass has long been basic in livestock feeding, emphasis on grassland farming has found rapid acceptance only since World War II. Essentially, it calls for seeding sufficient land with legumes and legume-grass mixtures to furnish pasture for the grazing season and grass silage and hay for the winter feeding program.

With a minimum loss of time so that a maximum of nutrients is retained, New Holland Rolabar Rake rakes the crop into windrows ready for the baler.

← Balers perhaps do the most to keep New Holland "First in Grassland Farming." At work, left, is a "Super 66" machine with power take-off which provides operation directly from tractor.



High-speed baling that cuts down the farmer's work load. On private farms across the country, scientifically timed baling tests have proved that the New Holland "Super 77" automatic twine-tie baler bales up to 12 tons an hour, and even this record can be bettered under good baling conditions.



IN 1947, THE CORPORATION entered the farm equipment industry by acquiring the NEW HOLLAND MACHINE COMPANY, with plants in New Holland, Lancaster, and Belleville, Pa. At New Holland, operations were recently started in a new plant, this company's largest, which has been designed for the centralized production of balers.

At the time of its acquisition, New Holland Machine Company had one predominant product. This was a one-man, twine-tie automatic pickup baler, which, when it was introduced in 1940, was the first machine of its kind ever to be put on the market. Although, by today's standards, this baler would be considered a crude machine, it had two major advantages over the old hand-tie balers then in limited use. It had a much greater capacity, and it eliminated the need for two of the three-man crew required by other existing balers. These features were responsible for the sharp rise in the popularity of baling over the last decade. Since 1940, the percentage of the annual hay crop in the United States that is baled has jumped from 17 to an estimated 78 per cent for 1956. The latter represents approximately 105 million tons.

In passing, it is also interesting to note that, up to 1940, only wire had been used for tying bales of hay. This was because ordinary binder twine had been found unsatisfactory. The first baler built to New Holland specifications was the first to use a special twine. A market for this baler twine has developed concurrently with the growth in popularity of hay baling, and today baler twine is an important item in New Holland's sales.

In 1954, New Holland began a program to expand sales and manufacturing operations overseas by establishing, as a subsidiary of The Sperry Gyroscope Company, Ltd., of England, the NEW HOLLAND MACHINE COMPANY, LTD. More recently, NEW HOLLAND AUSTRALASIA PROPRIETARY, LTD., was formed at Dandenong, 15 miles from Melbourne, Australia. This company manufactures some of the parts for and assembles New Holland machines shipped from the United States.

New Holland operates a farming experimental center where the experimental engineering department has complete testing facilities for use in the company's continuing program of developing new and improved grassland farm-



One machine for all forage crops. New Holland Forage Harvester operates with sickle bar, windrow pickup, or row-crop attachment.

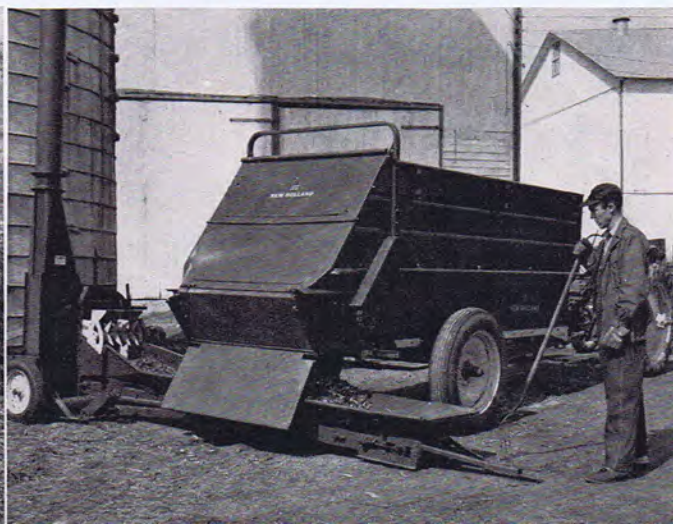
ing machinery. Certain fertilizer and crop experiments are also being carried out as part of the broad machinery-research activities. In addition to the work at the experimental center, extensive field testing goes on in many parts of the country, where experimental machines as well as those in production are constantly subjected to actual operating tests under all possible farming conditions.

The equipment sold by New Holland includes balers; forage harvesters; forage blowers; rakes; mowers; manure spreaders; wagons; baler twine and wire; and, latest to be announced, a portable crop dryer. In addition to its three major manufacturing centers, the company has 11 branch offices in the United States and Canada and is represented in 45 other countries.

Portable Crop Dryer, newest addition to line of farm machinery offered by New Holland.

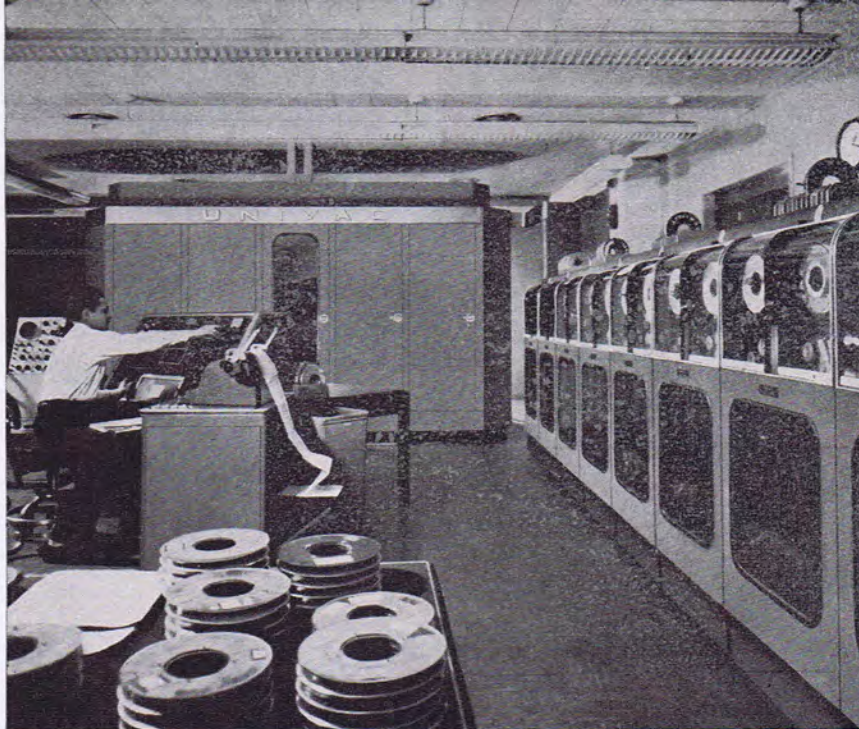


Fitting in with the modern trend towards multi-purpose machines on the farm, New Holland's Manure Spreader serves as a forage box for transporting chopped forage from field to silo and may also be used as a bunk feeder.





Univac systems have been installed in a large number of commercial and government locations. These include public utilities, insurance, and manufacturing companies. These efficient operations cover payroll, material control, budget and sales analyses, and billing applications. A large backlog of orders for Univac I and Univac II is on hand for future delivery.

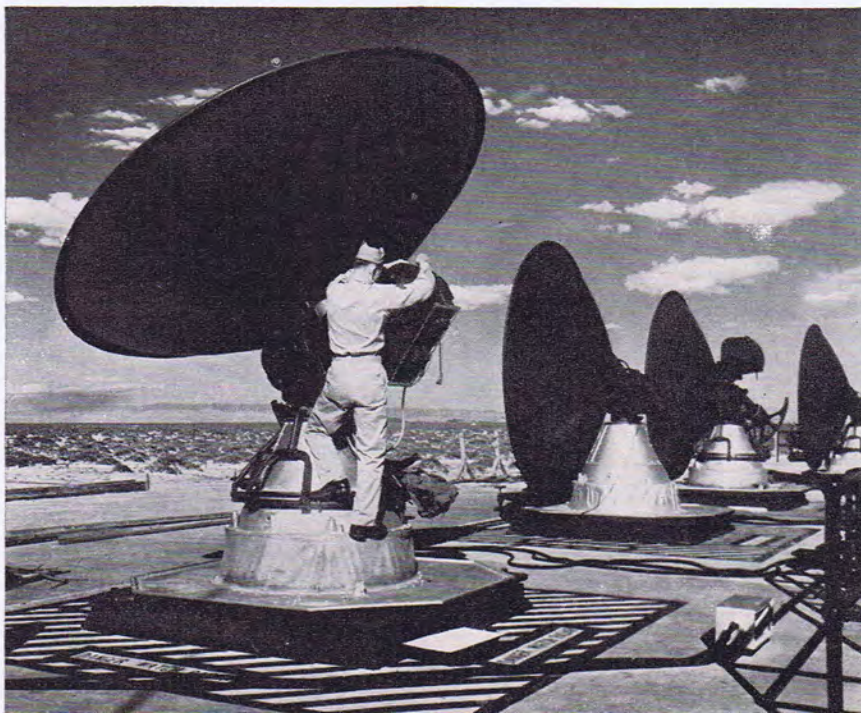


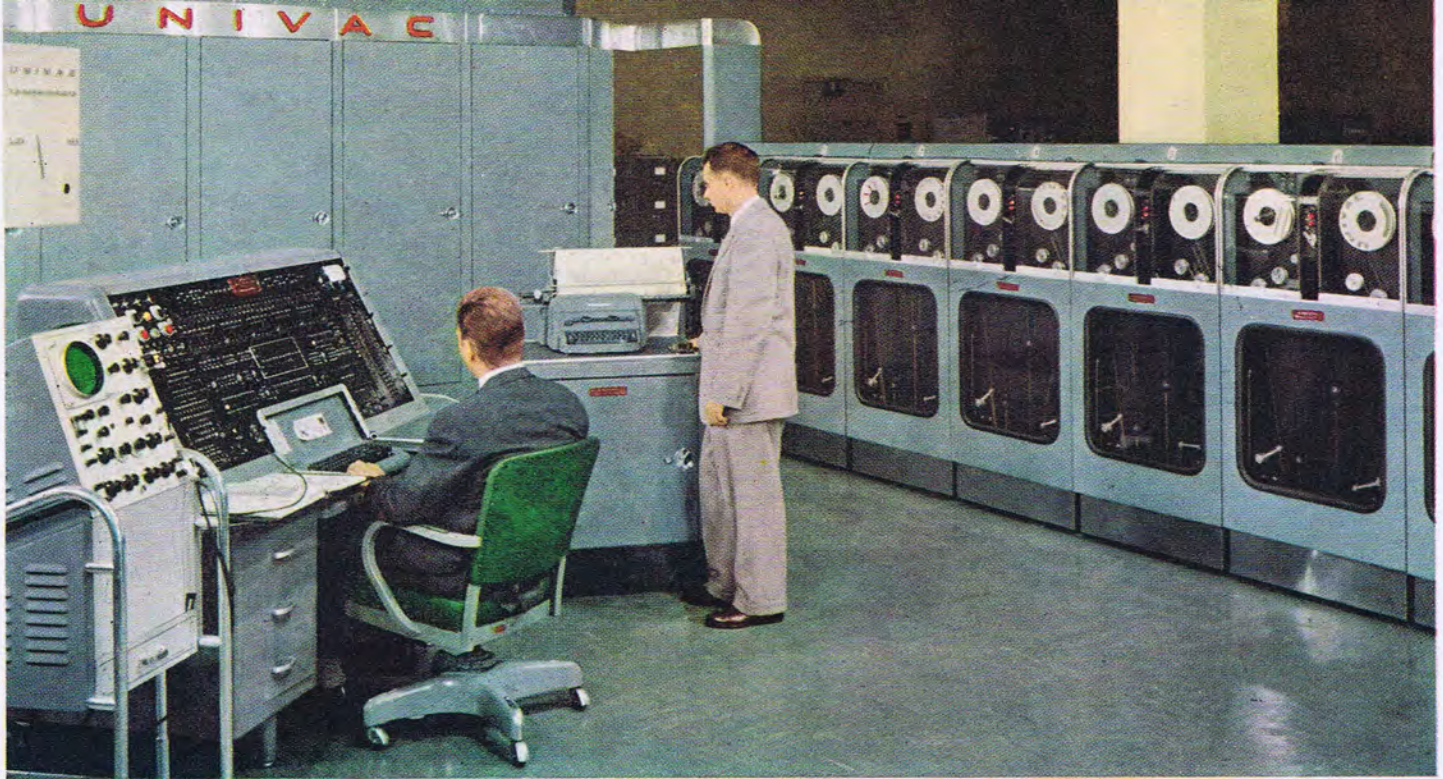
BUSINESS MACHINES

Business machines, systems, and equipment produced by Remington Rand Division increase the efficiency with which man conducts his government, his industry, and his commerce. The company's Univac electronic computer systems assist man to gain in a matter of hours or days what, in the past, has taken months or years. Answers to intricate calculations provided by these machines are making contributions to national defense, greater industrial efficiency, and a more profound understanding of the sciences that are the basis of a new and better standard of living for all.

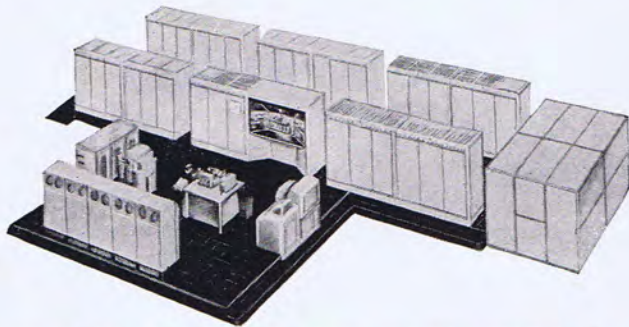
Radar Battery at White Sands Proving Grounds collects data for processing by a Univac Scientific Computer during firing tests for guided missiles.

← The Remington® Electric Typewriter and its counterparts in standard, noiseless, and portable models, produce letters a businessman can be proud to sign. Only Remington Rand makes all four kinds.



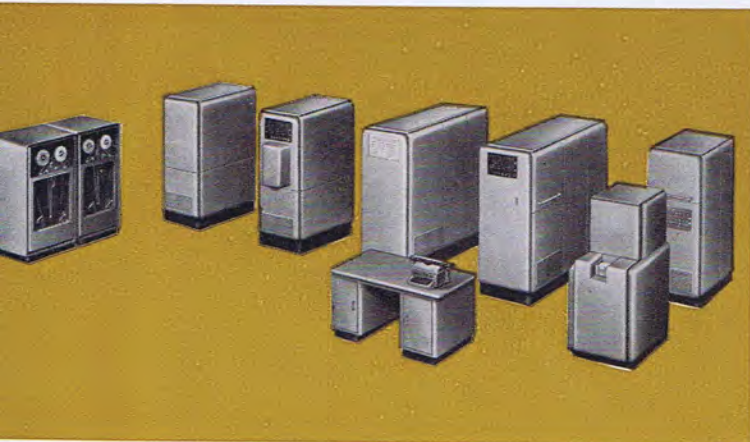


Univac II, all-purpose electronic computer system for commercial use, has magnetic core "memory," operates at input-output speed of 20,000 characters per second, is the only large-scale system completely self-checking for accuracy.



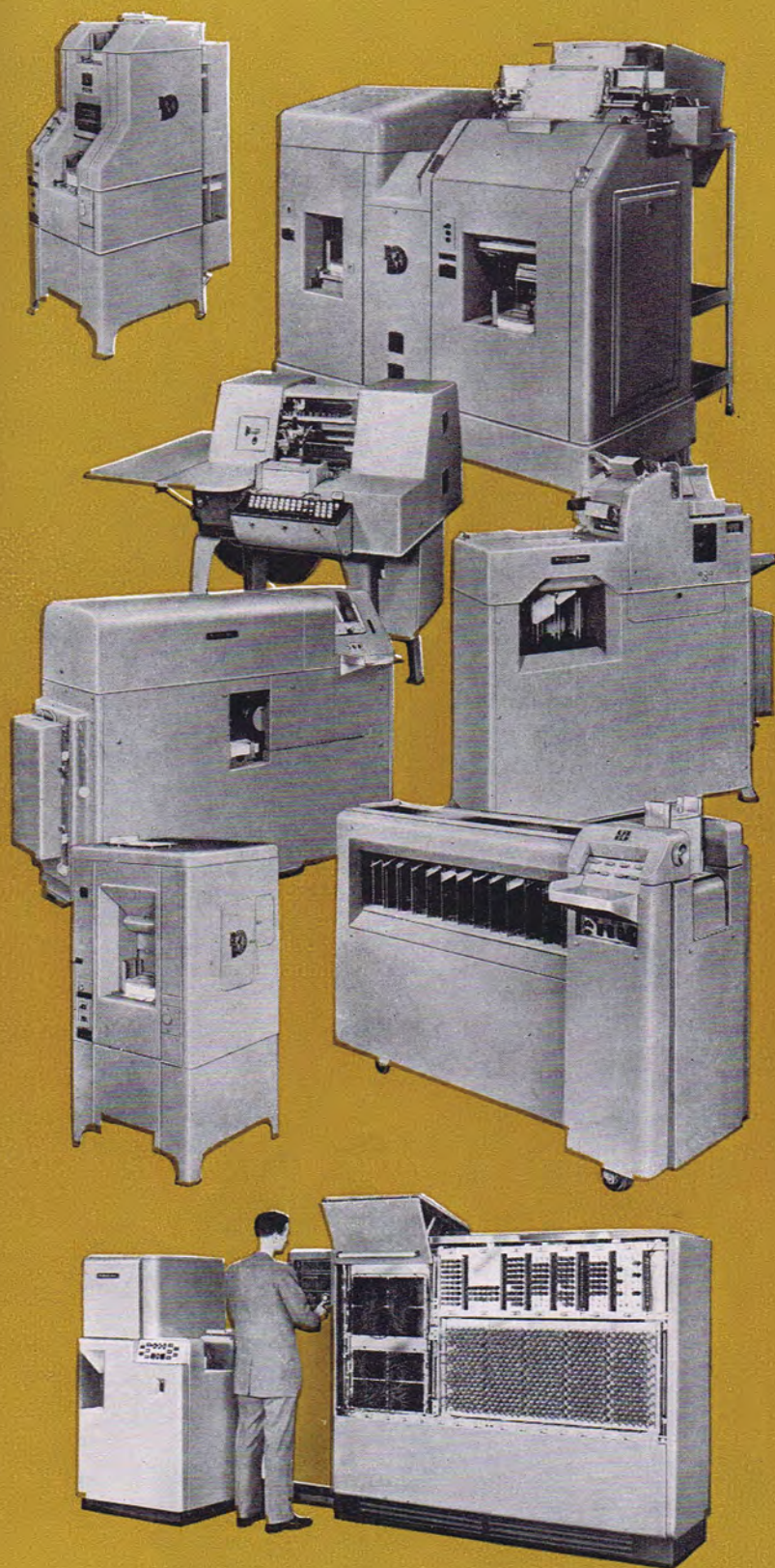
Univac Scientific System, above, is first system of its type to use magnetic cores for high-speed storage, combined with drums and tapes for greater memory capacity.

Univac File-Computer of modular construction combines large capacity magnetic-drum storage with extremely flexible input-output for wide range of intermediate business applications.



REMINGTON RAND INC. was organized in 1927, but the roots of the company go back to 1873. This was the year that the story of the Remington Typewriter began, following the manufacture of the first practical typewriter by E. Remington & Sons.

As years passed, various office-supply companies were added to the structure of the parent company. By 1927, the goal of President James H. Rand was to create an organization capable of supplying every need of business administration, from carbon paper to calculators. The assimilation in that year of, among other companies, the Dalton Adding Machine Co., the Powers Accounting Machine Co., the Baker-Vawter Co., and the Kalamazoo Binder Co., brought the realization of this goal within easy sight. Today, REMINGTON RAND DIVISION has a product line running to 20,000 items. Among these are filing systems, adding and calculating machines, typewriters, punched-card equipment, accounting machines, microfilm equipment, duplicator and typewriter supplies, shavers, and the famous line of Univac electronic computers. In addition to offering a long roster of business services, the company has had over 70 years of experience designing library furnishings and planning American libraries.



In panel on left are some of the advanced and versatile office machines from Remington Rand to mechanize figure-work and record-keeping for business. At bottom of panel is the Univac 120 punched-card electronic computer, which speeds and simplifies office procedure and routine by handling many complex record-keeping tasks at high speeds and with amazing versatility.

The Film-a-record microfilm machine, below, is one unit of Remington Rand's complete lines of photo-record equipment for modern business. In addition, Transcopy®, Rotoflo, and Dexigraph® printers produce highest quality photocopies of any record quickly, economically, and accurately.



Besides making other contributions during World War II, Remington Rand engaged in a project involving guided missiles. In 1946, a research laboratory was established at South Norwalk, Conn., staffed by electronics engineers who had taken part in this project. The first product of this laboratory was an electronic computer for use with tabulating machines.

In 1950, the company acquired the Eckert-Mauchly Computer Corp., Philadelphia, Pa., inventors of the Univac and its forerunner, Eniac; and in 1952, to round out its big computer line, Remington Rand purchased Engineering Research Associates, St. Paul, Minn., designers of scientific computers and magnetic storage drums.

Remington Rand had reached a significant milestone in company history, for it was now well launched into the new and rapidly growing field of electronic computing systems for use by science, government, and industry.

The great value of Univac lies in the speed with which it acts, the amount of information it can digest, and the accuracy of its results. The company has announced for delivery in 1956 Univac II — twice as fast and with double the capacity of Univac I.

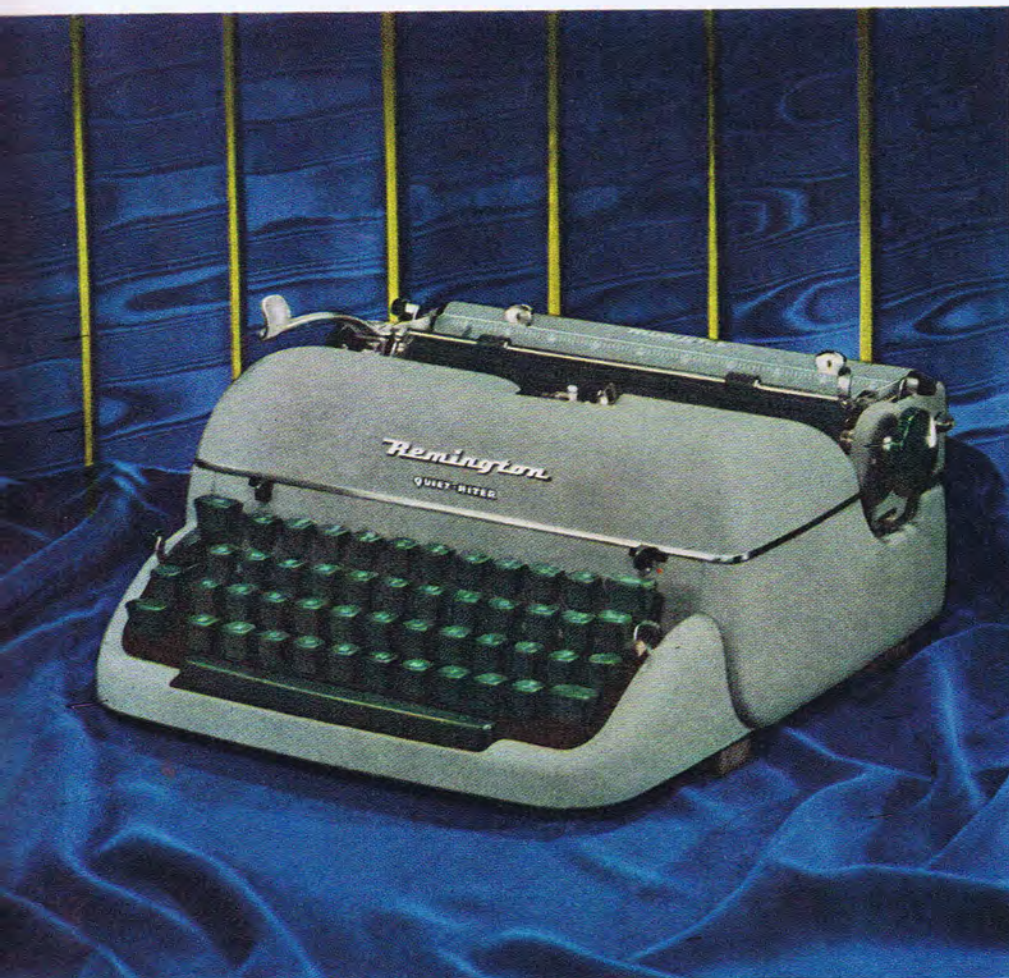
A large number of orders has been received for the new Univac File-Computer, an intermediate-sized business system uniquely adapted to on-line business operations, requiring instantaneous adjustment of status information such as inventories, sales data, bank checking-account balances, and airlines reservations. By the end of 1956, a number of these systems will have been installed.



The 99 Calculator-that-prints is a member of a family which includes the industry's broadest lines of electric adding and calculating machines and hand adding machines, all available in honey beige, mist green, desert sage, and gray velour finishes.

Remington Rand accounting machines are used on all accounting records in every type of business firm and institution. These machines provide operating savings up to 60%, simplicity of type-writer operation, and many other advantages.





The new Remington Quiet-riter. This complete typewriter in portable size has Miracle Tab and other exclusive features to make it the perfect writing instrument for the entire family. The machine is now available in decorator colors: desert sage, mist green, white sand, and French gray.



Kard-Veyer, one of the newest products in the Remington Rand line of mechanized files, is available for housing cards of various sizes.

Of special importance in Univac development is the giant computer created by Remington Rand for the Atomic Energy Commission's Livermore Research Laboratory. Known as LARC, this computer will work on several problems simultaneously at speeds 1,000 times faster than electronic computers now in use.

Among new developments is a keyboard-operated Magnetic Tape Verifier, which can record information onto metal magnetic tape from original documents, serve as an intermediate speed printer, or verify information previously recorded on a reel of magnetic tape. This third function provides, for the first time, a means of tape verification economically competitive with punched-card verifications.



The camera angle was not quite wide enough to take in this entire installation of 84 Convé-Filers at The Equitable Life Assurance Society home office in New York. Twenty-eight stations of three units each house a total of more than 14 million cards.



Colored crimped signals and sliding Graph-A-Matic® signals, plus visible-edge indexing, are important features of the Kardex® record system. Insulated Safe-Kardex cabinets, as shown, give certified protection against fire.

Remington Rand Robot-Kardex is applicable to any record control. Its high-speed reference is ideally suited to systems in which there are frequent demands for immediate information.



A MAGNETIC TAPE to magnetic tape high-speed data transmission system to transmit data over long distances via telephone or radio channels, and converters to provide automatic translation between Teletype tape and magnetic tape, and vice versa, were announced during 1955. These new units are harbingers of an extensive program to provide communication facilities between various locations where data may originate — storage warehouses, plants, and branches, for example — and a central data-processing headquarters where an appraisal of over-all operations can be made practically instantaneously.

Printing from magnetic tapes, 600 lines of numbers and characters per minute, on a line 130 characters wide, is accomplished by the Univac High-Speed Printer. The High-Speed Printer is available as an output device for all Univac systems. All of these systems have common-language magnetic tapes reproducible on the High-Speed Printer.

A new Remington Rand development representing another achievement in the electronic computer field enables the high-speed electronic computer to use magnetics throughout. This introduces an entirely new principle into electronic computer design and makes possible a drastic reduction in size of the central computer. This computer,

Main room in Topeka, Kansas, Public Library showing Library Bureau shelving, Trend furniture (apronless tables), and book display units.



known as the Univac Magnetic, was built for the Air Force Cambridge Research Center at Bedford, Mass. It utilizes brand-new circuitry elements called Ferractors and a new 16,500 rpm magnetic drum.

The postwar period has seen the development of the Remington Electric Typewriter, featuring tremendous savings in operator effort and distinctive beauty of printwork. Electric power has also been applied to mechanize filing units in the form of Robot-Kardex, Convé-Filer, Kard-Veyer, and Roto-Kard. Great savings in time and effort are achieved through this use of electricity in bringing files directly and quickly to the operator.

The past decade has witnessed an increase in the importance of Photo-Records, the art of transferring information to film and of duplicating material far more rapidly and economically than is possible by typewriter or conventional darkroom methods. Remington Rand Division produces a complete line of this equipment.

A large share of the Division's more than quarter-billion annual volume comes from its wide foreign operations. When the newest plant was opened for production in Naples, Italy, the score was 23 plants at home, 26 overseas. The latter are in 18 foreign countries.



Kompakt® Files provide one extra drawer in the same vertical space as standard files. With Kompakt, your desk-height file has 3 drawers instead of 2; counter-height has 4 instead of 3. Kompakt Files also have 5 drawers no higher than standard 4, and 6 drawers with every drawer in easy reach.

The world's largest-selling electric shaver.
Remington has made and sold more than 15 million electric shavers—more than any other make.





At Sperry Flight Research Department, MacArthur Airport, L. I., 11 company-owned aircraft and one helicopter are used primarily on developmental and research projects.

SPERRY RAND RESEARCH

"The industrial world is on the threshold of an era of pioneering scientific progress The old methods and solutions will no longer suffice. We must have new thoughts, new ideas, new concepts."

General of the Army Douglas MacArthur, Chairman of the Board, Sperry Rand Corporation.

RESearch IS A COMPANY'S insurance against the hazards of technological change and is its means of growth and progress. It embraces creation of the new, improvement of the old, and the use of previously gained knowledge and experience to meet specific needs.

Major fields in which research skill and ingenuity are being utilized by Sperry Rand companies are those of electronics, hydraulics, automation, business machines, and farm mechanization.

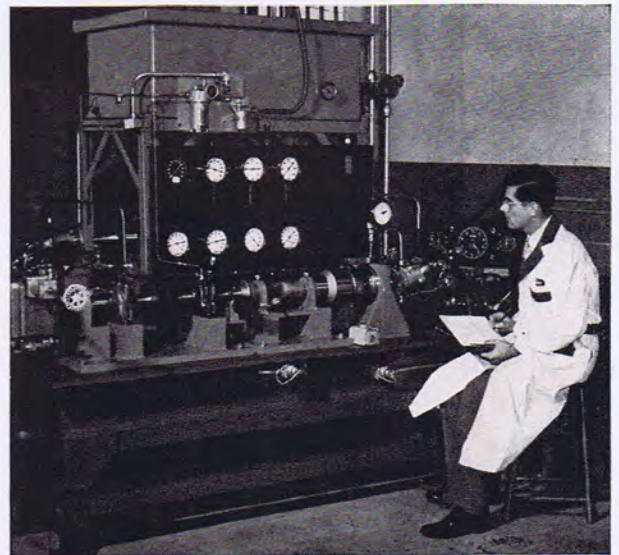
Sperry Gyroscope Company Division has engaged in electronics research for the past quarter century, and currently a long-range electronics research program is under way in such fields as radar, guided missiles, fire control, and inertial navigation. Remington Rand, long established in the business equipment field, has more than a decade of electronics research development behind it, and at this Division, electronics research goes forward in order that the company may retain its competitive edge and move on to more commanding leadership in the computer and electronics-for-business field.

Automation, the automatic performance of steps in a manufacturing process, is not new. It is, however, taking on increasing importance, for it is the logical result of the need for new and better manufacturing processes to keep pace with the demands of the consumer public and national defense. Moreover, automation is increasingly accepted in office management. As progress continues, the requirements put upon control devices become heavier. Greatly experienced in electronics, hydraulics, calculator-type mechanical brains, and precision manufacturing, Sperry Rand Divisions and subsidiaries are prepared to seek out areas in which fundamental research can make contributions to this expanding field of automatic operation.

The development and delivery of precision engine-control systems for advanced turbine-powered aircraft and guided missiles marked Sperry Gyroscope Company Division's entry into this critically important field of supersonic flight. Sperry, which has been conducting extensive research

With unmatched laboratory and basic research facilities, Vickers Incorporated continues its leadership in the hydraulics industry.

Below, Laboratory for Advanced Research, South Norwalk, Conn., where scientists and technicians strive to originate new materials, new processes, and new products for Remington Rand.





Sperry equipment is subjected to a wide variety of environmental tests to assure reliability under all possible operating conditions.

into the problems connected with turbine engine controls, expects to announce shortly the development of a wide range of advanced instrument systems for turbo and ram-jet engines.

At the company's Flight Research Department, MacArthur Airport, L. I., engineers are seeking solutions to tomorrow's flight control problems while they develop new ways to better the performance of control equipment currently flying. Studies in all-weather flying have been under way for many years, with greater flying safety the objective.

With thousands of dollars' worth of electronic and gyroscopic gear aboard, Sperry's experimental vessel *Wanderer* is used for deep-sea testing of ship controls and navigation systems in the company's marine research program.

Research in hydraulics has been consolidated at Vickers Incorporated in a new Administrative and Engineering Center recently opened in Detroit. Here a modern servo-mechanism laboratory and the most advanced electronic and other research equipment are made available to the company's large staff of hydraulics specialists and technicians. Jet flight has also imposed new problems in the design and operation of mechanical parts. At Vickers, one of the active fields of research involves finding lighter-weight and improved mechanical operation of aeronautical equipment through hydraulics. Active programs are in motion to improve and add to the company's hydraulic components, widely used in the machine tool, mobile, and aircraft industries.

Within the next decade, nuclear power plants are expected to become competitive with coal- or oil-fueled power plants. Ford Instrument Company Division is carrying on research in this field and is also pursuing an intensive research program under the Army Ballistic Missile Authority.

Research at Vickers Electric is concentrating on studies of semi-conductors and high-performance magnetic core materials, both fields closely allied to the product areas in which this company specializes.

Attention has already been called to the facilities and the varied extent of the research activities going forward at New Holland in the field of farm mechanization and the improvement of grass crops.

At Remington Rand Division, intensive research activities are continuously under way in well-equipped laboratories situated in South Norwalk, Conn.; Philadelphia, Pa.; and St. Paul, Minn.

Model of 2.5 megawatt, closed-cycle, gas-cooled atomic reactor power plant designed by Ford Instrument Co. and American Turbine Co.



Sperry's experimental vessel *Wanderer*, which is a floating laboratory for research and testing of new marine equipment.



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